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New York Edison Co.

Dinner in honor of
Thomas Alva Edison...

[New York]

1923

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Dinner in honor of Thomas Alva Edison and in commemoration of forty years of Edison service in the city of New York, given by the New York Edison company, Monday, the eleventh of September, 1922, at the Commodore Hotel. ⌐New York⌐ New York Edison company, 1923.

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Dinner in Honor of

Thomas Alva Edison

Given by

The New York Edison Company

Commodore Hotel, New York

September 11th, 1922

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Thomas Alva Edison

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Dinner in Honor of

Thomas Alva Edison

Given by

The New York Edison Company

Commodore Hotel, New York

September 11th, 1922

Gift of
President N. M. Butler
7-10-23

Dinner in Honor of
THOMAS ALVA EDISON
and in commemoration of
Forty Years of Edison Service
in the City of New York
given by
The New York Edison Company
Monday, the Eleventh of September, 1922
at the Commodore Hotel

The New York Edison Company
1923

M. W. L. Aug. 9, '23.

Opening Remarks of the Toastmaster

Mr Nicholas F Brady, acting as Toastmaster, after the service of the coffee and cigars, called the Company to order and said:

Mr Edison, Mr President, ladies and gentlemen: It is a great honor to welcome you all here tonight, to meet our distinguished guest. There is little that I can say that would add anything to his happiness or to yours. I am going to leave that to the other speakers, all of whom are eloquent.

The first speaker is the Acting Mayor of the City of New York, the Honorable Murray Hulbert. (*Applause*)

Address of Mr Murray Hulbert

Mr Toastmaster, honored guest, ladies and gentlemen: A few weeks ago it was my privilege to visit my boyhood home, and, of course, I had to attend a Sunday school picnic. On that occasion I had been asked to make a presentation to the pastor. When the afternoon had gotten well under way, and everyone seemed to be having a good time renewing friendships and acquaintances, the proceedings were suddenly interrupted by the master of ceremonies, who said, "Shall we have the address now, or permit the children to enjoy themselves a little longer?" (*Laughter*) And so I feel, as I look out upon your happy and smiling faces, (seated as you are, about a dais which is on the level of the floor, so that you are all at Mr Edison's table, all members of a happy family, gathered around to felicitate him), that it is a pity that the proceedings should be interrupted at this time by the introduction of myself.

I am grateful, however, for the fact that Mr Edison delayed the invention of the incandescent lamp until the year that I was born, so that I might have the privilege of being here this evening in the capacity in which I am attending this dinner.

When one contemplates the record of our honored guest, there is borne in upon him the truth that every man of history who has contributed anything to the march of progress and civilization in the way of a discovery or an invention, has been compelled to force his work upon a protesting humanity.

There was Christopher Columbus who fought for eighteen years for the opportunity to demonstrate that the world was round, and against the stings of poverty and the slander and the misrepresentation of his fellowmen. Dr William Harvey, when he proclaimed his theory of the circulation of the blood was laughed to scorn and presently lost his practice. James Hargreaves, the inventor of the spinning jenny was driven out of the spinning business. Richard Arkwright, despite the fact that the machine for making stockings was refused by the manufacturers of England, that all of the barristers denounced him, that the courts of law decided against the validity of his patents, turned his inventive genius to the making of the first cotton fabrics, and thus established one of England's greatest industries.

Oliver Evans, who, because of his petition in 1786 for legislation for the sole right to use wagons propelled by steam on the public highways, was deemed defective in his mental faculties, later succeeded in building a five-horse-power steam body, placed it on wheels, and ran it through the streets of Philadelphia to prove the correctness of his theory.

Then George Stephenson, the inventor of the first locomotive in England, used on the Killingworth Railway in 1814, encouraged by his success, took out a patent and built a series of locomotives which were used for hauling cars at the coal mines. At length he sought and obtained recognition by the British Parliament, but when it became known that a bill would be introduced to permit the operation of the steam railway a public appeal was made to oppose it. Pamphlets were written and distributed and newspapers reviled the railway; the poisoned air from the locomotives would kill birds, houses would be burned up by the fires thrown from the chimneys of the locomotives, boilers would burst and blow the passengers to atoms. There was also this consolation to wind up with, that the weight of the locomotive would prevent its movement. Stephenson had said to friends that he was confident a locomotive could be built that would carry a train of cars at the rate of twenty miles per hour, but such a claim was received by the public as ridiculous and the proposal laughed to scorn. His opponents tried to badger him in every way that they could. A distinguished barrister represented about the general level of ignorance at that time when he said: "Any gales of wind that would affect the traffic on the Mersey would render it impossible to set off a locomotive, either by poking the fire or keeping up the pressure of the steam till the boiler was ready to burst."

Gas, as an illuminator, was first introduced by William Murdoch, who constructed a gas meter and apparatus for lighting his own house. Satisfied with his achievement, Murdoch inaugurated a gas lighting system at Soho, Birmingham. But the invention made little or no progress. This new agent, everyone said, was dirty; had an ill smell, and produced headaches. Street lamplighters went on strike and parish authorities declared their intention to uproot any lamp posts and pipes erected in their jurisdiction. The people could not understand the possibility of conveying gas and thought that the pipes themselves would be full of flames. Even Sir Humphry Davy declared it would be necessary to use a receptacle as large as the dome of St Paul's cathedral as a gas holder, and Sir Walter Scott sarcastically remarked that it was proposed to light the City of London with smoke.

The first dramatic scene which followed Eli Whitney's invention of the cotton gin was its theft and duplication.

It took Dr Edward Jenner three months before he could find a person willing to submit himself as a subject for vaccination in order to demonstrate the truth of Jenner's discovery.

Plenty of people laughed at Robert Fulton's enterprise. Idle-minded men crowded near the shipyards and gave their reasons for predicting the certain failure of "Fulton's Folly" as they nicknamed the *Clermont*. Lack of money proved a hindrance, but she began her first voyage on the 17th of August, 1807, and there were almost as many quaint descriptions of the boat as there were people who saw it. One described it as ungainly, a craft looking precisely like a backwoods sawmill mounted on a scow and set on fire. Others said that the *Clermont* appeared at night like a monster moving on the waters, defying winds and tides, and breathing volumes of smoke. Some of the ignorant along the Hudson fell on their knees and prayed to be delivered from the monster.

Cyrus McCormick, a Virginian, in 1831 produced a machine that successfully cut grain. The following year he demonstrated it to a gathering of harvesters who were not too eager to see a mechanical device enter into competition with their labor. So skeptical were the farmers that it was several years before a reaper was sold. During the panic of 1837 McCormick surrendered his farm and other property to his creditors but none of them was interested in the crude reaper sufficiently to consider it worth taking. Faith had its reward. In 1840, a stranger rode up to his workshop and bought his first reaper for $50. A little later other farmers invested and he had the satisfaction of knowing that in the harvest of 1840, three of his reapers were used. By 1844, he had sold fifty machines. His log workshop had become a busy factory. Necessary materials were not to be obtained in Virginia for his growing business, so in 1847 he established himself in Chicago where his great industry has grown to tremendous proportions.

Samuel F B Morse filed his application for a patent on his invention of the telegraph in 1837 and, failing to secure from Congress an appropriation for an experimental line between Washington and Baltimore, went to Europe seeking aid. The governments there refused funds or patents. Upon his return home, he began a heroic struggle for recognition. Finally, after repeated disappointments, on the last night of the session of the Twenty-seventh Congress, March 3, 1843, by a vote of 90 to 82, $30,000 was appropriated to construct a trial line between Washington and Baltimore.

During the years from 1830 to 1840, Charles Goodyear was frequently imprisoned for debt. The use of rubber during this time was attracting general attention and he became interested in finding a way to increase its utility. Much of his experimentation was carried on in prison, and he became the butt of those who did not share his faith in the ultimate success of his experiments. Early in 1859, Goodyear found that rubber coated with sulphur and then heated was rendered uniformly elastic in all temperatures. He had solved the problem, but it was fully two years before he could convince anyone of that fact. Finally, William Rider furnished capital for carrying on the process of manufacturing rubber goods. Goodyear's friends considered him as a monomaniac. He even dressed in rubber clothes in order to test them. Upon being asked how Mr Goodyear might be recognized, a friend replied: "If you see a man with an India rubber coat on, India rubber shoes and India rubber cap, and in his pocket an India rubber purse without a cent in it, that is Goodyear." (*Laughter*)

The hope of relieving his extreme poverty set Elias Howe to work in 1843 upon the invention of the sewing machine, and he fared as had Mr Goodyear.

Alexander Graham Bell brought forth the first instrument that would transmit spoken words. Although his invention became an object of great interest at the Centennial Exposition at Philadelphia, business men could see little future for its development for practical purposes. They admitted that it was very ingenious but declared that it could be only a toy. It remained for our honored guest of the evening to demonstrate the use that could be made of an electrical toy in order to smooth the pathway of humanity.

Born in circumstances as humble as any of the great inventors who preceded him, his youth was beset with trials and obstacles; and his early manhood was equally as strenuous in effort and enterprise, yet he succeeded in surmounting his difficulties and rising to the pinnacle of his chosen field of endeavor.

We are reminded of his great capacity for details (and that has been defined as the essence of genius); we have learned of his deep reverence for accuracy and carefulness, yet had it not been for a slight deviation from that straight path we might not have heard of Thomas Alva Edison, for my information is, that when in his early days he was engaged in the sale of newspapers on one of the Western railroads, he began experimenting in the baggage cars, and there rigged up a sort of a temporary laboratory; and upon one occasion he spilled a quantity of acid which set fire to one of the cars. In consequence of this the boy lost his position, but within a day or two thereafter he was instrumental in saving the life of a child of the station master, and so grateful was the father of that youngster that he undertook to teach him the science of telegraphy. So it was that Mr Edison became a telegrapher which started him upon his journey of accomplishment. One of the great things that he did with the knowledge thus gained was to invent and give to humanity that notable achievement of sending four messages at one time upon one wire, which he afterward extended to six; and not alone was he active in the improvement of the telegraph, but his invention of the carbon transmitter was one of the great factors in the development of the telephone.

How fortunate it was for the commercial world that Edison had acid to spill, for it was not long before he had set his sun in the firmament to light the world, and if other men had been hounded nigh to death for merely one discovery, how would our esteemed guest have fared in those days with his more than one thousand inventions?

Can any one forget his impressions on first hearing the

talking machine? Do you remember how you felt like uttering the old farmer's soliloquy when he first saw a giraffe, "There ain't no such animal"? Why, it was witchery, more heinous than ever condemned a poor old crone in Salem. The machine that gives voice even to those who speak no more!

And the motion picture! Registering forever the actions, the gestures, the live features of the great men of this day so that future generations need never again depend upon the pictures painted by the facile pens of gifted artists, but may see for themselves the things and men that were.

And paradoxical as it seems, we can see in action in public those who may then be sleeping soundly in their downy beds.

And if Hargreaves, Stephenson, Arkwright and their brother inventors were among the outstanding figures of their day, how shall we classify Mr Edison, who, applying his discoveries of the dynamo and the electric light to these inventions, has given them a capacity and an efficiency that would have compelled even these geniuses to gasp with wonder.

His invention of the storage battery has not only produced motive power for vehicles but has also brought the art of refrigeration nearer perfection. Thus in the study of Mr Edison's life one is impelled to reach the conclusion that he must be numbered among the world's greatest benefactors to humanity.

Is it reasonable to suppose that without the discovery of the incandescent lamp there would be such an instrument as the X-ray that makes possible today cures that a few years ago would rank as miracles?

And so it goes through the whole realm of mechanical power; the gifted mind of Edison has supplemented the slower generating power of steam, by the instantly responsive and dynamic force of electricity.

Even as Moses with his rod struck the rock and the waters gushed forth, so Edison struck an electric current and turned night into day. In fact, in this regard, Mr Edison, by the abolition of darkness, is the father of real daylight saving. (*Applause*)

Although Columbus discovered America, Edison bettered him by making an empire out of a single municipality of America; I refer to the great City of New York.

We have all grown so used to what we have that it takes an occasion such as this to make us understand our great good fortune over that of our fathers.

The electric light and the electric train made New York's subway possible.

Who can remember without a shudder New York's puffing, snorting, noisy steam engines on our elevated roads?

The discovery of the electric dynamo made possible those huge office buildings of which New York is so proud.

Can anyone picture a Coney Island Mardi Gras by gas light? And what would Broadway be without its white light district?

So the people of New York, both in their hours of work and in their hours of play realize that Mr Edison has in very truth made easier and more agreeable their path of life. And therefore, as Acting Mayor of this great municipality, I know that in extending congratulations to Mr Edison, I am giving voice to the sentiments of our six millions of people and their feelings of appreciation and gratitude for his great work for humanity, and I take great pleasure in presenting you, Mr Edison, with this gold key which carries with it the Freedom of the Greatest City on Earth. (*Applause*)

THE TOASTMASTER: I have great pleasure in introducing Mr Charles Edison, who will respond for his father, Mr Thomas A Edison. (*Applause*)

Response of Mr Edison

Mr President Hulbert, I thank you sincerely for your courteous presentation of the freedom of the City and will you kindly convey to His Honor, Mayor Hylan, and to the Honorable Board of Aldermen of the City of New York my deep-felt appreciation of the distinguished honor conferred on me and of which I am very proud.

This commemorative celebration has a deep personal significance to me, for the Pearl Street Station was the greatest adventure of my life. It was akin to venturing on an uncharted sea. No precedents were available. I felt the sense of a great responsibility, for unknown things might happen on turning a mighty power loose under the streets and in the buildings of lower New York. However, I kept my own counsel. Thanks to the faithful co-operation of my unfailing companions, the Pearl Street Station was carried promptly to the point of successful operation. The later development of the industry is a matter of history.

As I look around this assemblage, my thoughts run backward to those days. Although Father Time has laid his silvery fingers upon us, the memory of our early strugglers at Pearl Street affords a pleasant retrospect. It is natural as I sit tonight surrounded by so many of my old friends and fellow workers, there should be mingled with my joy something of sadness as I think of the men whose companionship we can no longer share. If there be some addition through my work to the resources of human welfare, that benefit has accrued largely through my good fortune in being favored with the devotion of my associates willing to throw their all into my melting pot. I have never ceased being grateful to the Edison men whose friendship I have enjoyed ever since the morning, fifty years ago, when I landed here from the Boston boat.

To the wider circle of friends, I must express the fullest appreciation of the encouragement that has enabled me to perfect various inventions, and is notably embodied in the splendid public utilities bearing my name, of which The New York Edison Company is typical. I would think more highly, perhaps, of the little I have done if I did not feel it to be only a promise of what lies before. There is still much to be done in the promotion of human happiness and comfort. (*Loud and prolonged applause*)

THE TOASTMASTER: Before introducing the next speaker, I should like to call your attention to the electroliers on the left and on the right side of the room, above this table. These, I understand, are the first electric chandeliers made in this country, and they were wired by Mr Edison himself, over forty years ago, and were in use at Menlo Park at that time. (*The chandeliers were then lighted*) (*Applause*)

The next speaker is a man whom we all look up to as the head of the industry in which we are engaged, in the United States—I refer to Mr Samuel Insull, of Chicago.

Address of Mr Samuel Insull

Mr Chairman, honored guest, ladies and gentlemen: It is a great honor to have the privilege of speaking for the industry on this occasion. This assemblage, whilst of a very brilliant character, has amongst it the largest aggregation of old Edison men whom it has been my privilege to meet in a great many years.

Many of the faces here recall a great deal of the romance of the electrical light and power business. It has been my pleasure to serve under the name of Edison for upwards of forty-three years, and before I speak on what I might term the more formal part of the occasion, I would like to reminisce just for a little.

Some forty-four years ago whilst going from one part of London to another, on the underground railroad, operated by steam at that time, (and producing such noxious vapors that we used to call it "the sewer"), I was looking for a theme for a paper for a literary debating society of which I was a member. Noticing on one of the bookstalls a magazine with an article with reference to the American inventor, Edison, I purchased a copy. I obtained the subject for my debating society paper. I then proceeded to hunt up all I could find out about Thomas Alva Edison.

At that time I had for the same purpose worked pretty threadbare the subject of English inventors. I had seen Mr Edison's named mentioned a number of times in connection with his telephone, telegraph and phonograph inventions, but I had not had an opportunity to read much about him, so when I struck this particular magazine article on his electric lighting experiments at Menlo Park, (the publication of which resulted, as some of you may recall, in a great decline in gas shares), I became very much interested in the subject matter of the article, and it occured to me I would very much like to be associated with such a man.

It was by the merest accident, however, that a few months after that, I became the private secretary of Edison's London agent. Before I had the pleasure of Mr Edison's personal acquaintance, I had many examples of his resourcefulness. I remember one in particular. We were exploiting the Edison telephone in England. The people who were exploiting the Bell telephone obtained an injunction against the use of the Bell receiver and we thought we were about done. My chief cabled Mr Edison, and within a very few hours we got a reply from Mr Edison from Menlo Park that he would invent and send over another receiver, and it came there within a month or so. (*Applause*)

Mr Edison sent over to England about that time a number of so-called telephone experts—I think there are probably one or two of them in this room this evening—I think I know one of them who has traveled 3000 miles to be here tonight. They were pretty wild. I may mention, too, that Bernard Shaw worked in the battery room of the Edison Telephone Company in London, and you will find that he describes that room in the preface of one of his books.

One of the engineers sent over there—not one of the wild ones, but the man in charge of them—Mr Edward H Johnson, and myself became extremely good friends. As a result Mr Edison sent for me on Mr Johnson's suggestion to come over to this country and act as his private secretary.

I remember my first meeting with Mr Edison as if it occurred only last night. It was on the First of March, 1881, about six o'clock in the evening. I had just come off the steamer, a raw English boy. I think that Mr Edison was a little disappointed at the youthful appearance of his new private secretary, although he was very kind in the way he received me. The first thing that he said to me, was that I had better go and get some dinner, as he had quite a lot of questions to ask me about the financial side of his English telephone interests that night because Johnson was sailing for Europe the next morning on the steamer *Arizona* at five o'clock and he thought we could get through before the steamer sailed.

That was my introduction to the Edison light business. The meeting took place at 65 Fifth Avenue, in this city, the old office of the Edison Electric Light Company. Right after dinner we sat down and Mr Edison explained to me that it was necessary for him to start three or four manufacturing establishments to produce the dynamos and lamps and underground conductors which would be required for the installation of the first district of the electric light system in New York. He produced a wallet from his pocket and told me that he had $78,000 to his credit at Drexel, Morgan and Company, and he asked me where he could get the balance. I was quite "sot up" at the idea that I was to become an electrical financier; however, I was reasonably familiar with his telephone affairs in Europe, and before Johnson departed for the steamer, we had made out a list of avenues from which quite a large sum of money could be realized from his telephone inventions in different parts of Europe. The thing that particularly impressed me was the fact that this man was ready to back his own judgment with his own money, and the admiration which I had felt for him before I met him increased a hundredfold that night.

Affairs at that time in connection with Mr Edison's inventions were not altogether rosy. It was not easy to obtain the capital necessary for the development of the business, and Edison stopped experimental work at Menlo Park and moved into New York for the purpose of assisting in the commercial development of the business. The owner of his electric light patents, the Edison Electric Light Company, of which he was a very large stockholder, considered them of such great value that there was unwillingness to risk them by going into the manufacturing business, and there was nothing for Mr Edison to do but to go into it himself.

Naturally, in such an undertaking mistakes were made. I remember the place where we made underground conductors at 65 Washington Street, down here in the lower part of the town. The underground conductors were composed of iron tubes, with half round coppers inserted, into which a bituminous compound was forced. They were 20 feet, 6 inches long, and the building in which they were manufactured was about 16 feet wide; so it was necessary to take the tubes out of the window in order to turn them around. There were just such mistakes as that kind which were made. I also remember that our friend, Francis R Upton, who was running the Edison Lamp Company at that time, was supposed to sell incandescent lamps for 35 cents each, and they cost somewhere from $1 to $1.50 apiece, and it was "some financing" to make the bank account balance under the circumstances.

We had lots of experiences of that character, but I never saw Mr Edison lose his nerve with relation to the final outcome of the business, except once. I was trying to find out from him tonight about the date that must have been. I should think it was about '83. One night after supper he came into the office, and we were going over some accounts to find out where we could get the money for the following Saturday's payroll, and he remarked that it looked a pretty hopeless proposition. He thought that we were about at the end of our rope. He said, "Sammy, do you think that you can earn a living again as a stenographer, because if you do, I think I can earn my living as a telegraph operator, so that we can be sure of having something to eat, anyway." (*Laughter*)

Such incidents indicate the kind of experiences that brought a great many of the men in this room close together, and it matters not in what part of the world they may be, they all have the same kindly, personal love for "the old man" (*applause*) and it is a great pleasure for me to take part in this occasion.

I have spent the last three decades in assisting in the commercial development of this great business. I spent upward of a decade in the personal service of Mr Edison. I spent several years in London in his telephone business. The thing

I am proud of above anything else, is that it has been my privilege to work for forty-three years, in one capacity or another, in one class of electrical business or another, and all of these businesses bearing the name of Edison. (*Applause*)

The years have rolled by since that time but my admiration for Mr Edison has increased a hundredfold. The more I am associated with the electric light and power business, the greater I have appreciated the marvelous work that he accomplished in connection with that business. It is becoming, I think from one of those who have followed him, to say that there is no commercial system for the production of electrical energy that does not use Mr Edison's methods. (*Applause*)

* * *

If you walk along Pearl Street, just south of Fulton Street, you will find at No 257, on the west side of the street, a bronze tablet which states that "In a building on this site an electric plant supplying the first Edison underground central station system in this country and forming the origin of New York's present electrical system began operation on September 4, 1882, according to plans conceived and executed by Thomas Alva Edison." It is to celebrate the fortieth anniversary of this event, and to do honor to the man whose master mind conceived and achieved what amounted to an industrial revolution in the production and distribution of energy, that we are assembled here this evening.

It was in the winter of 1878–1879 that the world's attention was centered upon the experimental work of Mr Edison at Menlo Park in connection with the use of electricity for lighting and power purposes. Whilst various inventors had worked on and developed systems of arc lighting and had produced low resistance experimental incandescent lamps, no one had, up to that time, conceived the idea of producing a complete system for the production and distribution of electric energy. It was Mr Edison's study of the broad subject and his conception that a complete system was necessary that led to a series of brilliant inventions, including the high resistance incandescent lamp and his work on electric generators, and culminated in what, to my mind, was the greatest engineering achievement in connection with this subject, namely: the planning of his feeder and distribution system, and the development, a little later, of his three-wire system.

It is not my purpose this evening to go into the scientific and technical details of the brilliant accomplishments of the distinguished inventor. Controversies as to the value of his achievements have long ceased. The basic fundamental work accomplished by him in inventing a system for the generation and distribution of electrical energy, which has never been supplanted (but has been supplemented by other systems of production and transmission), is so universally acknowledged that it would not seem fitting, on an occasion of this kind, to occupy your time with detailed technical explanations.

It must be remembered, however, that Mr Edison's work in connection with the establishment of his electric light and power system was not limited alone to his accomplishments as an inventor. Besides the experimental work of the laboratory, this great inventor was the controlling and engineering mind that carried out the designing, installation and first operation of his central station electric lighting system.

He made the first experimental central station installation at Menlo Park, with his laboratory, work shops, offices, machine shop and residences that surrounded his experimental establishment, as the distribution area. This demonstration was in the winter of 1880–1881 and, in respect to service rendered, was as perfect as the service now given by the central station companies in our large cities. The difference between an experimental demonstration and an actual commercial installation to serve the public, was, however, very great and it might be well to pause for a moment and picture the condition of the art at that time, namely, the winter of 1880.

The plans for the central station were completed and the details of construction of the conductors in the street were all on paper. But the dynamos and electrical instruments had no existence except on the draughting board; practically nothing was known of modern methods of insulation or of house wiring; the socket and switch in use today had not been thought of; the miscellaneous devices now considered necessary in connection with house-wiring had not been considered. In addition to the development of the system and its installation, manufacturing establishments had to be created in which to manufacture the first material needed. Mr Edison and his corps of assistants had to abandon the experiments of the laboratory and the designing of the draughting room to equip and manage shops in which to manufacture the apparatus necessary, from the generator to the lamp. The conception of the system, the perfecting of the original apparatus, its manufacture, its installation, and its early operation were all borne by this man whom we honor tonight, assisted by an enthusiastic but small band of workers having an almost idolatrous belief in their chief as the pioneer of this great industry.

For the purpose of putting the Edison electric lighting system into commercial operation the Edison Electric Illuminating Company of New York was formed on December 17, 1880, and was, I believe, the first local electric illuminating company ever organized to do incandescent lighting business on a commercial basis. The present New York Edison Company is its successor.

The Pearl Street property was purchased in May, 1881. The laying of the street mains began in July of the same year. The first current was generated in the Pearl Street Station for testing purposes on July 8, 1882. On September 4, at 3:00 p m, the system was put into permanent operation. It ran, with the exception of two slight breaks in the continuity of service, until January 2, 1890, when a fire occurred which interfered with part of the service for about half a day and the balance for about ten days; so that, practically, the system started on September 4, 1882, has operated continuously for upwards of forty years, and the business established at that time has developed into the vast organization now operated by The New York Edison Company. The first year's gross receipts amounted to a little over $53,000 ($53,089.65) and the gross receipts for 1921 amounted to nearly 51 million dollars ($50,761,531.63).

The original capital invested in the Edison Electric Illuminating Company of New York was $1,000,000. The cash resources were entirely exhausted by the installation of the station and system. It may be well here to recall a circumstance which, from my relations with Mr Edison at the time, I have a very distinct recollection of, but which he may have forgotten by now, namely: that after the capital of the company was exhausted, and before the enterprise became self-supporting, he, personally, through his own manufacturing establishments, supplied money and credit of upwards of $200,000, which was no small amount for him at that time.

As I have said, the original capital invested was $1,000,000, while today the capital invested in New York alone amounts to about 155 million dollars ($154,830,000). This first start in New York City, only forty years ago, has developed into one of the most important industrial businesses in the country; as the total annual receipts of the light and power business of the United States today amount to about 737 million dollars ($737,000,000), while the total capital employed amounts to about four and a quarter billion dollars ($4,250,000,000).

The Edison Electric Light Company, the patent owning company, which supplied the money for the original experiments at Menlo Park was organized on Mr Edison's behalf by the late Grosvenor P Lowry, of the law firm of Porter, Lowry & Stone. The people in interest were mainly people connected with the Western Union Telegraph Company, of which Mr Lowry was counsel, and which from time to time had acquired a great many of Mr Edison's telegraphic inventions. Later on Drexel, Morgan & Company became interested; and I know of no one to whom the industry and Mr Edison owe so much, in connection with the early financial support of the central station industry, as to the firm of Drexel, Morgan & Company whose early partners invested not only in the patent owning company but also in the local central station companies in New York, Boston and other cities.

I shall not attempt tonight to recall all of those who took part in assisting Mr Edison in his early experimental work and the building of the first central station here in New York; but his principal assistants at that time were Charles Batchelor, Edward H Johnson, Francis R Upton and John Kreusi. They have all passed away. There are many men in the industry today who were connected with either the designing, construction or operation of the Pearl Street Station. To try to enumerate them would be to run the risk of omitting someone. I will mention but one name, Mr John W Lieb, now vice-president of The New York Edison Company, who was the first electrician of the Pearl Street Station and who today occupies a position of very great distinction in connection with the electric light and power industry.

The original territory served by the Pearl Street Station was very small as viewed from the point of view of what we do today. It was bounded by Wall, Nassau, Spruce, and Ferry Streets, and the East River. The entire generating capacity of the station was 7200 sixteen-candlepower lamps with probable rated kilowatt capacity of about 450. Connected with this system were about fifty-nine customers using nominally 1200 sixteen-candlepower lamps. This small beginning has developed into an enormous system of lighting and power distribution covering not alone the greater portion of the Metropolitan area of New York but extending to the electric railway system of New Jersey on the one side and the electric railway system of Connecticut on the other side.

If you consider the system in the New York Metropolitan

District under The New York Edison Company and a company having the same ownership. The United Electric Light & Power Company, there are ten public-utility companies, owned or controlled by the Consolidated Gas Company, now operating jointly in the Metropolitan district. Economical power stations generate the base load, the others operating only during the three or four months of the peak load.

High tension power is supplied in bulk to a number of public-utility companies having independent corporate existence, of which several are distributing, lighting and power companies. Others are trolley systems—one with a power-house capacity of 30,000 kilowatts, operated by The New York Edison Company (only during peak months, however), under lease. Another is a large trunk-line railroad system, the western section of the New York, New Haven & Hartford Railroad. A third is a high speed interurban road, the New York, Westchester & Boston Railway. Still another is an interstate third-rail tunnel railroad, the Hudson & Manhattan Railroad, operating through river tunnels between New York and New Jersey, and with a power house of 25,000 kilowatts capacity, operated by The New York Edison Company, under lease, but only during the two or three months of peak load.

High tension tie interconnections are also maintained, permitting interchange of power with the large elevated and subway systems of New York and Brooklyn, with the Interborough Rapid Transit System and the Brooklyn Rapid Transit System, and also with emergency connections for interchange of power with The Brooklyn Edison Company.

The territory covered extends some seventy-five miles from the New York City Hall to the Putnam County line and the state line of Connecticut. These several connections are made through underground high tension feeders, operating at 20,000 volts, and inter-county overhead, steel-tower, suspension insulator transmission lines operating at 40,000 volts.

As I have previously stated, I have no intention, whatever,

of going into any extensive scientific or technical discussion of Mr Edison's accomplishments as an inventor in connection with the development of the electric light and power business. I would, however, be violating my personal feelings, and be neglectful of my duty if I did not say something of the influence of this one man upon this great industry. Mr Edison's work on telegraphic and telephonic apparatus and his discovery of the means of recording and reproducing the human voice firmly established him as a great inventor. He was by no means the first experimenter or the first person to endeavor to adapt electricity to the use of man, as an illuminant or for power purposes. Whilst the Patent Office records of this and other countries bear tribute to his contribution to the development of the art, we have to go a little deeper to discover the paramount influence of his mind in connection with the development of this industry. If you will study the technical literature of the period contemporaneous with his early electric light experiments you will find how little the writers of that period understood the theory of the production and distribution of electric energy, not alone as the technical man understands it but as the ordinary layman, the man in the street, understands it today. But few writers of the technical press of that time had any conception of what Mr Edison was trying to produce.

It was understood in the popular mind that he was endeavoring to sub-divide the electric current for ordinary everyday use, but the principles underlying this popular conception were little understood either by the technician or the layman. It was Mr Edison's conception that what was needed was a translating device—that is, an electric lamp of high resistance taking a small quantity of current of relatively high pressure.

That was the first stepping stone to success. You can call this if you like, a discovery, you can call it the intuition of a natural mathematician, you can call it the establishment of an engineering principle. But the translating device, once settled on as the cardinal principle, the production of the device itself, the working out of the details of the apparatus, the generation of the energy, the conducting (or transmission) of it, the measuring of it, and the controlling of it, were all matters of invention or engineering detail. Each one was a step by itself, demanding foresight, vision, brilliant conception of methods to be used, and indomitable pluck and perseverance in working them out; but yet, as compared with the original conception, all were matters of detail.

It took the transcendent genius of an Edison to discover that a high resistance translating device or its equivalent was the first essential to success; and that discovery was the primary step towards placing him on a level with the few whom the people of all time will put in the first rank of the world's inventors.

The Toastmaster: I am afraid that some of you may have been misled by something in Mr Insull's speech into thinking that one of Mr Edison's inventions was Bernard Shaw. (*Laughter*) I am assured that if he had discovered Bernard Shaw, he would never have published the invention.

We have on view tonight one of the original Edison lamps made over forty years ago, which I would like to show, then after that the largest incandescent lamp that has been made up to date, which takes 30 kilowatts in current to run it. (*Demonstration made*)

The next speaker on the program is at present the President of the National Industrial Conference Board, one of the leading lawyers for many years in this country, the patent attorney for the General Electric Company, General Counsel for the General Electric Company for many years, and at one time President of the American Telegraph and Telephone Company.

I have great pleasure in introducing Mr Frederick P Fish. (*Applause*)

Address of Mr Frederick P Fish

Mr Chairman, Mr Edison and Ladies and Gentlemen: We are celebrating the little Pearl Street Station of forty years ago, which was the foundation of the great electrical development all over the world with which we are so familiar. As Mr Insull has said, many men have contributed to that development; great engineers and inventors like Dr Thomson, Mr Tesla, Dr Langmuir and Dr Coolidge; great executives like Mr Coffin and Mr Westinghouse who organized and directed the manufacture of the apparatus, and Mr Lieb and Mr Edgar in the central stations. Mr Insull has been a leader both in manufacturing and in central station work. But we must recognize that this whole great development goes back to Mr Edison. He was the man who originated it. He started it, and placed it upon a firm foundation from the very beginning. It has never departed from that foundation, although it has grown and grown mightily in every direction.

It is a rash thing ever to say that one man is the greatest in his line of achievement; it is futile and absurd to ask who was the greatest poet or the greatest soldier or the greatest statesman; but I believe that if we approach the matter cooly and sanely we shall all be obliged to recognize and to assert that Mr Edison is the greatest of all the inventors whose work has been recorded in history. (*Applause*)

There are many forms of invention and many types of inventor; some inventions are an accident; they say that the discovery of glass was an accident, but it took a real inventor to appreciate the significance of the event when men, sitting around a fire in Asia Minor or Syria, saw glass for the first time, and to realize what benefit it might be in the future for the human race. Sometimes an invention comes as an inspiration. Mr Edison, I think, has said, that genius is not inspiration but perspiration. (*Laughter*) That is only partly true, for sometimes it is inspiration. For instance, I personally am utterly unable to conceive how he ever conceived the simple thought of the carbon filament. To realize that a thing so insignificantly small, and of such material that if touched with a match it would disappear at once, was the basis for lighting by incandescence, required genius. The thought was a real inspiration.

Another form of invention is appreciating a problem and working with full knowledge, by logical processes until that problem is solved.

Another is research; studying persistently the materials and the forces of nature and trying one experiment after another until you finally come to something that is useful. Though some inventors are great in one direction and some in others, Mr Edison has been great in every form of inventive effort that is known to man.

Among his inventions, the one that to my mind stands out most conspicuously, as one of the very greatest of all inventions that have been made in historic times, is the incandescent lamp, followed as it was by his marvelous work in creating the system of distribution by which that lamp, could be utilized. Thus he created incandescent lighting, the greatest possible material boon to the world.

But Mr Insull has called attention, and so has Mr Hulbert, to many of Mr Edison's other marvelous inventions in telegraphy and telephony, the phonograph and the moving pictures. I have only time to say one word about this particular invention of the incandescent lamp and it is a point of view that interests me very much. I am going to preface what I have to say by a remark made by Abraham Lincoln, who, in 1859, before he was nominated for President, made a speech in Illinois in which he said that there were certain things that had happened in human history that were not only great in themselves, but were particularly great because of what was involved in them and developed from them; he named four.

One was the invention of writing, which was in pre-historic times.

One was the invention of printing, about the fifteenth century.

Another was the discovery of America, and the fourth, strangely enough, (and it illustrated the sense and the intelligence and the farsightedness of that great man), was the introduction of the patent system.

Now, ladies and gentlemen, I believe that it is no exaggeration to say that the invention of the little incandescent lamp was of the same class. It was great in itself and pre-eminently great in the results that have developed from it. The invention itself was most brilliant from every point of view, for it involved not only the highest imagination of the inventor, but a scientific and accurate correlation of the laws of physics, of electricity, of mechanics and of heat, such as no man had ever worked out before; although much attention had been paid to the question of developing an electric light, no real progress had been made until Mr Edison solved the problem. He did not stop there, he went on, as Mr Insull has said, and worked out all the fundamentals of the great systems of today for lighting and power. One of his great inventions made at the same time, one not so generally appreciated as some others, was his dynamo, which was the first constant potential, self-regulating high efficiency dynamo. In designing it he departed from all precedent, from all the rules of the books, for he said, "I need a low resistance armature and a high field." He was scoffed at by the scientific men of the day for that dynamo, as he was scoffed at for what he said he hoped he could do by way of electric lighting. But in both instances he was right.

It is very interesting to note what some of the great scientific men of the world said about his ideas as to electric lighting, as he talked of them and disclosed them during the years 1879 and 1880. How superior was his thought to that of the greatest minds of his time! Sylvanus P Thomson, a great English electrician, spoke of Mr Edison's "airy ignorance." He said that any system of lighting, depending upon incandescence would fail. Sylvanus Thomson said that, and proved it too by all the rules of the science of the day.

President Henry Morton, a famous scientist in this country, said that Edison had done too much really good work to have his name discredited by his talk as to what he thought and hoped and believed he could do with the incandescent lamp. Du Moncel, a famous French scientific man, in 1880, declared that the ideas which Mr Edison was advancing with reference to the carbon lamp—that was after the carbon lamp had been invented—were examples of "American hoaxes" and this at a time when the carbon lamp was burning. Preece, one of the greatest English inventors, said, that the subdivision of the electric light, which means getting it to a point where it was useful in small units, was an "*ignis fatuus*," and "hopeless". Those were his words, but Edison went ahead and proved the contrary. Today we see millions and millions of these lamps in the City of New York, the results of the "hopeless" work of this man.

Now, ladies and gentlemen, the point I want to bring out—for I think it most interesting—is this: that when this incandescent lamp was invented, small as it was and narrow as seemed its place in industry, it was in fact, in and of itself, the real foundation for the most remarkable industrial development that the world has ever seen; even the introduction of steam which was a comparatively slow process contributed little if any more to our material progress. The incandescent lamp has only been in existence forty years, and yet what has grown from it? Consider it first merely from the lighting side. It has resulted in the most perfect illumination that we know anything about; it is a light that can be of any size; it has practically no heat; there are absolutely no products of combustion; the wiring can be so arranged that you can turn on one, two, ten or a hundred lights anywhere and from any point by a proper system of switches; it gives a beautiful light, which can be shaded as you want and can even be turned up and down, if you want so to do. Surely it was a marvellous contribution to convenience, to comfort and to efficiency.

Immediately there was a tremendous demand for it. And what did that mean? The development of a station for supplying and distributing electricity, and that station came, as Mr Insull has said, through the engineering skill, the persistency and the energy of Mr Edison. I do not believe that any other man who ever lived could have produced the Pearl Street Station which had in it, in practicable form, substantially every feature of the great stations of today. They started at Pearl Street forty years ago, and from that time on electric lighting has developed until it is what we see today. And why? Because people wanted the incandescent lamp. And what was the basis of it? Mr Edison. (*Applause*)

Then came the alternating current system. It started in Europe for use with Mr Edison's lamp. It was finally brought over here by Mr Westinghouse, and at the end of the nineties, it was a definite part of the Edison system, merely an attachment, so Mr Edison should have the credit for the development as well as the men who really brought it into his system.

Many other inventions are part of the history of the incandescent light which helped to bring it to its present position in our houses and on our streets, all inspired by Mr Edison's work and based on it. But that is not all.

The electric motor had been known before the starting up of the Pearl Street Station, I have heard—I cannot vouch for it—that the first motor was discovered by accident, by a man who wished to hitch together two Gramme machines to run them in series, and he accidently crossed his belts. The result, to his surprise, was that he found one generator driving the other as a motor. At any rate motors were known. But how many of them were in use? There were none. Why? Because there was no field for them, there was no system of distribution for them, there was no opportunity for them; but just as soon as the central station came for the development of this little Edison's incandescent lamp, then there was a field available for motors, and as men built up their stations of course it was the most natural thing for them to use the motor on the same circuits for the sake of getting additional revenue. Thus electric power distribution became for the first time a reality and from this start on, the Edison lighting system, has come all our great power development throughout the world. Mr Edison was back of it all.

Then, also, conditions were ripe for the next great development in the field of electricity, and that was the electric railway. Mr Edison himself built an electric railroad in 1880. He made a good start, and if he had not had so much else to do he might have gone further with it. At any rate it was because of the existence of the great distribution systems perfected in connection with the use of the incandescent lamp, because of the development of motors as an incident to the operation of incandescent lamps—all due to the original invention of Mr Edison—that it was realized and determined that electrical energy could be used in the electrical propulsion of cars in subways and on elevated railroads, on city streets and on the great trunk lines of the country. I can not take time to do more than refer to the fact that the perfection of the storage battery (Mr Edison has invented one of the greatest value) and of heating, cooking and other electrical household appliances and all special applications of electric power, also go back to invention of the incandescent lamp as does power distribution itself. Mr Edison and his work were the basis of the entire development. These great electrical industries, enormous in extent, have not only altered the operating methods of all industries, and enlarged tremendously our industrial field, but have given us an opportunity for work and for production that otherwise would not have existed; the great factories that manufacture electrical apparatus; the great and small electric lighting companies, like The New York Edison Company, employ hundreds and thousands of men, all of whom are doing productive work because Mr Edison invented the incandescent lamp. Just think of the extent to which iron and copper and tungsten, and platinum, and coal are being

mined for no other purpose than in order to supply the demand for material for the various industries which are based, as I have shown, on this little incandescent lamp of Mr Edison, and think of the building material and the machinery that are produced to meet their needs!

We cannot conceive what our situation would be if the incandescent lamp had not been invented. But we can see that the invention and its development into extensive light and power systems, through Mr Edison largely—at any rate he was at the foundation of it—has led to the employment of millions of people and to added comfort and happiness for the whole human race. There has never been anything more fruitful or productive and out of which so much more has grown as that wonderful invention, made in the year 1879. As we have the eagle for the emblem of our country and England has the lion, I think that there could be no better emblem for industry as a whole than the incandescent lamp which typifies one of the greatest things ever done for industry by the greatest inventor that ever lived, and typifies the way in which industries can be developed from small foundation, if that small foundation is of an essential character, having in it the basis for a tremendous and far-spread development in the interest of the human race. (*Prolonged applause*)

THE TOASTMASTER: Among those who were not able to be present here tonight, but who sent regrets and congratulations to Mr Edison are Professor Elihu Thomson, Mr Bion J Arnold, Mr Frank Sprague, Mr Tesla and Dr Hibben.

The next and the last speaker will be Mr John W Lieb, who needs no introduction. (*Applause*)

Address of Mr John W Lieb

FORTY YEARS OF EDISON SERVICE

Mr Chairman, honored guest, ladies and gentlemen: Many of the old friends and early associates of Mr Edison, who are honoring us with their presence here this evening in celebration of this notable event and some of whom were on the spot forty years ago when the service of the old Pearl Street Station was inaugurated, could not, in their wildest dreams, have imagined the epoch-making importance to the world of the great demonstration in which they were then taking part.

After years of patient, untiring, persistent effort, under the inspiration and direction of the great master mind and sustained by his buoyant faith, the day had come when the supreme test was to be made of a stupendous idea, the working out in practice of a bold conception, the launching of a great new enterprise—the generation of electric current on a commercial scale in a central station, and its distribution through an extensive system of underground conductors to furnish a house-to-house supply of light and power over a considerable area of a great city.

It was not the mere dream of an optimistic inventor that we are considering, involving the practical application of a new device, apparatus, or piece of machinery, nor the exploitation of a newly patented process or method of manufacture. It was to be from its very inception a complex aggregation of many parts, before any one single element of the many that were necessary to solve the problem, had been perfected—many, perhaps, not even conceived. It was a broad and comprehensive conception requiring the intimate correlation and co-operation of many units, some mechanical, some electrical, some chemical—all to be joined in a hitherto unknown and untried operating relation to produce

a result not clearly defined except as it involved the rendering of a substitute or alternative service for one that was already being supplied to the public.

The bold concept of Edison was no less an idea than to parallel or duplicate along entirely new and novel lines, a flourishing and fully developed industry—the gas industry—that had been in existence as a successful and lucrative business for fully seventy years, beginning with the Royal charter in 1812 of the Chartered Gas Light and Coke Company of London.

And yet, while having in mind the fact that Mr Edison was contemplating the development of a competitive industry, it should be stated that he was broad enough in his views to believe that the introduction of a practical system for the distribution of electricity for light and power would not mean, necessarily, the doom of the gas business as clearly indicated in one of his notebooks in which he specifically states that gas properties were having conferred on them "an enhanced earning capacity."

This brings to mind the utterances of a pioneer in the introduction of the Gas Industry, F A Winsor—rival of Murdoch and Le Bon—who in a pamphlet in connection with the promotion of the "National Light and Heat Company" in London, in 1809, answered the question: "what is to become of our tallow chandlers, our oilmen, our wick and snuffer makers?" by stating that these were all to work for exportation—become exporters, or sell to merchants; and as for the ancient lamplighters, they were to light *clearer* lamps in a *cleaner* dress, and no longer annoy the street passengers with the smoke and dirt of train oil, whilst the poor chimney sweepers, he hoped, would get a more Christian-like employment.

Not content, however, with terse arguments in prose, lauding the improvement he proposed to introduce, in the vain endeavor to get even a hearing for his novel gas supply project, Winsor thus burst out into poetry:—

"Must Britons be condemned forever to wallow,
In filthy soot, noxious smoke, train oil, and tallow, and their poisonous fumes forever to swallow?
For with sparky soots, snuffs and vapours, men have constant strife;
Those who are not burned to death, are smothered during life!"

Let us examine briefly, by the light of historical inquiry, into the state of another new and in turn no less revolutionary art which was introduced right here in New York in the year 1882. What were some of the more important elements of this remarkable combination which, right from the start, showed such entire practicability, was ready for immediate commercial development, and established at once the foundations of a new business—the basis of a colossal new industry?

We find that during 1876–1877, Mr Edison had been working on the telephone and microphone and later in connection with various uses of carbon began experiments with it used as a burner for incandescent lamps, then turning his thoughts for a time to the use of platinum and to the less fusible metals such as Boron, Iridium, Rhodium, Ruthenium, and Chromium, sometimes in the form of bare wires and sometimes coated with refractory metallic oxides.

In 1878 Mr Edison joined an expedition to Wyoming to observe an eclipse of the sun and shortly after his return he writes:

"After my return from the trip to observe the eclipse of the sun, I went with Professor Barker, Professor of Physics in the University of Pennsylvania, and Dr Chandler, Professor of Chemistry in Columbia College, to see Mr Wallace, a large manufacturer of brass in Ansonia, Connecticut. Wallace, at this time, was experimenting on series arc lighting. Just at that time I wanted to take up something new, and Professor Barker suggested that I go to work and see if I could subdivide the electric light so it could be got in small units like gas. This was not a new suggestion, because I had made a number of experiments on electric lighting a year before this. They had, however, been laid aside for the phonograph. I now determined to take up the search again and continue it. On my return home I started my usual course of collecting every kind of data about gas; I bought all the transactions of the gas-engineering societies and all the back volumes of gas journals. Having obtained all the data, and investigated gas-jet distribution in New York City by actual observations, I made up my mind that the problem of the subdivision of the electric current could be solved and made commercial."

This then—the famous subdivision of the electric light—was the keystone to the problem that Edison set before himself, and once a solution was found he proposed to proceed next to develop its commercial application.

This is not the occasion for setting forth in tedious technical detail the engineering facts and statistical data, however interesting they may be historically, regarding the various elements that in the aggregate and in combination go to make up the Edison system of electric lighting, that reached its successful demonstration on that memorable day in September, forty years ago, whose anniversary we are celebrating.

We have referred to the subdivision of the electric light which at that time meant the invention of an incandescent electric lamp which, when developed, should become the cornerstone of a new lighting system. We shall devote our attention first to this most important element of the system, although the last in logical sequence if we were to proceed from the power house or central station out to the distributing system in the street, and then through the wiring and installation on the customer's premises to the lamps or other translating devices for converting the electric current into light, heat or power.

Dynamos, singly and in groups, had been previously used to generate electricity and these were connected to outside conductors usually overhead; electric lights—arc lamps—

had already received extensive application in the lighting of streets and larger interiors, and incandescent lamps had also been used on a small scale in connection with isolated installations and smaller local overhead systems; but an extensive underground house-to-house commercial electric light system, furnishing current to a large number of customers, complete in every imaginable detail operated from a power house specially constructed and equipped largely with novel machinery from the ground up, was something new and untried, a thrilling but expensive adventure, the success of which, from either an engineering or financial standpoint, was at least open to serious doubt and certainly required practical demonstration.

In giving consideration to the development of a practical incandescent lamp it was necessary right at the outset to reach a momentous, epoch-making decision, which would have a compelling influence on the design and construction of practically every other element of the proposed system and possibly determine their characteristics forever thereafter. This decision was of such importance that we shall use Mr Edison's own words in reference to it:

"What we desired at that date, and had settled our minds upon as the only possible solution of the subdivision of the electric light, was that the lamps must have a high resistance and small radiating surface. About December, 1878, I engaged as my mathematician, Mr Francis R Upton, who had lately studied under the great physicist Helmholtz, in Germany, and he helped me greatly in calculations of the multiple-arc problem. Our figures proved that the lamp must have at least 100 ohms resistance to compete successfully with gas; for if the lamps were of *low* resistance the cost of the copper main conductors would be so great as to render the system uneconomical and commercially impracticable."

Here, then, we have a most remarkable situation; the necessity, through certain theoretical calculations made by Edison and under his direction, involving the commercial

and economic practicability of the whole scheme, of selecting and determining in advance a voltage for the system and hence for the individual lamps.

The selection of a high resistance for the lamps, presupposed the use of a relatively high lamp voltage, while the low resistance lamps experimented with by contemporaneous inventors required a low distributing voltage and large and expensive conductors or, as an alternative, an undesirable series system.

Incandescent lamps had been made before Edison's epochal invention, but they were made with short and relatively thick rods or slips of carbon or metal, of comparatively low electrical resistance, connected in series in a lighting circuit, like beads on a string, and therefore not independent of one another but all dependent on the integrity and continuity of that circuit. ✓

Edison's invention of a practical operative high resistance lamp, with an attenuated thread-like filament, mounted in an exhausted glass globe, made it practicable to connect the lamps in multiple-arc, like the rungs of a ladder, thereby making it possible to serve a group of lamps or an extensive distributing system with a relatively low expenditure for copper in the conductors. ✓

The selection by Edison of a high resistance filament lamp made development of many of the elements of such a system more easy, but the attainment of success in the production of the lamp itself, the most important element of all, was thereby made most difficult, and only reached by an exhaustive series of researches, experiments and investigations. It is a remarkable testimonial to the far-seeing wisdom of the decision then taken that, today, after forty years of development and evolution of the central station art in every possible direction, the standard lamp voltage still remains as at first determined about 110 volts. ✓

That such should be the case with marked changes in the filament itself from Carbon—in the form of paper, bamboo and cellulose—to Tantalum and finally to Tungsten—first in the form of pressed paste filaments and then wire drawn—both in vacua and inert gases, makes the prophetic selection all the more remarkable.

The astonishing persistence even in the most modern types of lamp of the original pear-shaped globe and the very practical original Edison screw base should also not pass without notice; although a distinct evolutionary advance has, of course, been made in the course of time in the candlepower of the lamp unit, as well as its efficiency, responsive to the ever expanding public demand for more light.

The decision by Edison to make a lamp with a filament of high resistance was fundamental in determining the practicability of the subdivision of the electric light, by making use of the beautiful and intensely practical multiple-arc system, a broad *principle* carried out in every detail of the Edison system, mechanically as well as electrically, and contributing so notably to its simplicity and flexibility.

This problem of the subdivision of the electric light, which Edison had determined to solve, involving the splitting up of the dazzling high candlepower of the arc lamp into a number of small units of light such as could be used in the home and the store without sacrifice of efficiency, had occupied the minds of the best scientific intellects of the whole world and they were quite unanimous in declaring the problem insoluble, a chimera, an ignis fatuus. But this did not daunt the courageous inventor from pursuing, relentlessly, his experiments and exhaustive researches, for such they were in the highest sense of the term and not merely haphazard tests and experiments.

He had profound faith, boundless enthusiasm, and a prophetic vision that was bound to reveal the goal; the type that Emerson refers to where he says:

"We are all inventors, each sailing out on a voyage of discovery, guided by a private chart, of which there is no duplicate. The world is all gates, all opportunities, strings of

tension waiting to be struck; the earth sensitive as iodine to light; the most plastic and impressionable medium, alive to every touch, and whether searched by the plough of Adam, the sword of Caesar, the boat of Columbus, or the telescope of Galileo—to every one of these experiments it makes a gracious response."

Having now discussed the broad foundation on which the Edison system was projected and its corner-stone the incandescent lamp, let us consider as briefly as possible some of the other salient features of the system.

Very soon after a commercial incandescent lamp appeared in sight, Mr Edison directed his attention to the "heart" of the electric system, the dynamo, and there soon appeared those typical, tall-magnet bipolar machines having vertical field magnets which were such a familiar feature of the very early installations.

The art of building dynamo-electric machines was at that time in a very embryonic state. Electricians generally regarded the dynamo as the equivalent of a primary battery and they considered that, like a battery, to obtain the maximum amount of work from a dynamo, its internal resistance should be made equal to the resistance of the external circuit. Edison early recognized that to obtain the highest efficiency from the dynamo he must reduce the internal resistance as much as possible, and obtain a maximum amount of energy as useful work in the external circuit. Hence his efforts to produce a dynamo of *low* internal resistance and the greatest possible elimination of internal losses by laminating, japanning and separating with paper, the iron core discs, thereby increasing the efficiency of the dynamo at one jump from the previous figure of from 30 to 35 per cent to nearly 90 per cent.

It will be remembered that in the "Jumbo" dynamos built after the second or third machines, the horizontal fields had a greater number of magnet cores above the armature than under it. The reason for this unsymmetrical arrangement of the field gave rise at the time to all sorts of conjectures and even exhaustive mathematical calculations; the latter developed so far as to prove that this disposition of the field was purposely designed to develop an excessive magnetic pull upward, tending to lift part of the weight of the heavy "Jumbo" armatures off the bearings, thus reducing the friction!

When the first Edison stations were projected there arose immediately the necessity for a satisfactory engine of high speed and of fair size for direct connection to the "Jumbo" machines or in smaller sizes for belted drive to bipolar and later to multipolar generators.

The Porter-Allen engines were the first to be thus applied, but the Armington & Sims engines, and later several other well-known types, were promptly developed to meet the severe requirements of this service. The extensive demand for steam engines created by the rapid construction of central stations at this time acted as an extraordinary stimulus to engine builders, and marked improvements in steam economy, reliability in service, regulation, etc, were the immediate result.

The Edison central station system was a practical working success at the very beginning. Difficulties were encountered of course; unexpected, patience-trying contingencies and emergencies had to be met, but the system worked, it delivered satisfactory service, and presently it showed also the beginnings of a sound commercial and financial success.

At the very outset Mr Edison provided for absolute independence not only of the individual lamp but almost every other element of the system, from the boiler in the station to the interior wiring on the consumer's premises; and whether the apparatus be mechanical, protecting it by stop-valves, ring steam mains, by-passes, or apparatus in duplicate, or electrical, by providing alternate paths and parallel supply circuits, all were constructively connected like the rungs of a ladder. In other words, the system was not dependent for its operation on any single one of its elements, every feature was practically in duplicate, and means were provided so that any defective section could be instantly segregated and eliminated, where practicable, automatically.

The fundamental principle of operating everything in "multiple-arc," a simple and efficient method of securing duplication of every important working part, is absolutely essential to regularity and continuity of electric service of the highest standard, and this we know has always been a conspicuous outstanding feature of the Edison system and the corner-stone of its commercial success.

Let us now consider some of the earlier pioneer Edison lighting plants.

The first experimental marine plant on the Edison system, a small dynamo operated by manpower, as there was no steam engine aboard, was installed with a few lamps on the ill-fated Arctic ship, the *Jeannette*, which left San Francisco with the De Long Expedition in July, 1879, and was lost in the Arctic.

The pioneer commercial marine application of Edison incandescent lighting appeared about May, 1880, on the steamship *Columbia* plying between San Francisco and Portland, Oregon.

The first Edison isolated plant was installed on the premises of Hinds, Ketcham & Co, printers, New York City, in January, 1881.

The first mill lighted by the Edison system was the James Harrison Woolen Mill, in Newburgh, N Y, started September 15, 1881; the first hotel, the Prospect House, Blue Mountain Lake, Adirondacks, went into service October, 1881; the first private residence, that of Mr J Pierpont Morgan, a director of the Edison Electric Illuminating Company of New York; the first theatre, the Bijou Theatre, Boston, started December, 1882.

The first central station driven by water power was a small plant at Appleton, Wis, which was started about October 1,

1882. The first three-wire station was started at Sunbury, Pa, July 4, 1883, and the first three-wire station with underground conductors was started in Brockton, Mass, October 1, 1883.

The first "Jumbo" dynamo was sent abroad and operated at the Paris International Electrical Exposition, in October, 1881. The second "Jumbo" was started at the Holborn Viaduct station, London, England, January 12, 1882, a second machine shortly thereafter, the station inaugurating regular operation on April 11, 1882, on a small scale in a temporary location; it was rather a demonstration plant than a permanent station, and service from it was discontinued in 1884.

We now come to the historic Pearl Street Station whose inauguration forty years ago we are celebrating today. It was located at 255–257 Pearl Street, New York, and was the prototype of the modern central station for the generation and distribution of electricity for light and power purposes. It started regular service at 3 p m on September 4, 1882.

The station began service with a load of 400 lamps supplying some 85 buildings wired for 2300 lamps, supplied with current through a complete underground system having a total length of 15 miles of feeders and mains, covering the district bounded by Wall, Nassau, Spruce and Ferry Streets, Peck Slip, and the East River, an area of about one-sixth of a square mile.

The Pearl Street Station had many features which were typical of central stations of the best design for many years; the screw-conveyor coal and ash-handling apparatus, traveling crane with hoists, water-tube boilers, ring system of steam mains, high speed engines and direct-connected units, forced-draft blowers and feed water heaters were all of distinctly modern types, and were the standards incorporated in station design for many years following. In accordance with the boiler-room practice of the time, the boilers were fed by injectors, with steam pumps as alternative auxiliaries. There were four Babcock and Wilcox boilers, with a rating

of 240 horsepower each connected to two steel stacks, one at each end of the building.

The "Jumbo" dynamos, of which there were six in the Pearl Street Station, each had a rated capacity, helped along somewhat by a blower circulating air around the armature, representing a total of 1200 sixteen-candle power lamps, individually consuming 0.75 amperes at 110 volts, a capacity of about 100 kilowatts. These dynamos were direct-driven at 350 revolutions per minute by engines, at first of the Porter-Allen type later changed to Armington & Sims, each rated at 125 horsepower and indicating a maximum of about 200 horsepower, at 120 pounds steam pressure, the unit weighing about 30 tons.

The electrical equipment, particularly as regards voltage and output-measuring instruments, was exceedingly primitive, with no central switchboard, and while comparative indicators of various types for maintaining pressure and crude ammeters on the feeders soon became available, it was some years before satisfactory direct-reading central-station switchboard instruments made their appearance.

The station building was sold by the Company in 1895, and there is now nothing left to mark the historic spot except a bronze tablet in front of the building, bearing the inscription on the following page.

It was, however, the underground system of the Edison stations installed in the larger cities and towns that exhibited remarkable and epoch-making characteristics.

The Edison tube system, aside from its remarkably perfect engineering plan of feeders and mains—sectionalized and multiple-arced—secured through the indications of galvanometer or pressure wires a uniform pressure throughout an extensive network notwithstanding variations of density of territory and changes in load.

The Edison tube itself, in 20 foot lengths containing the conductors projecting from each end had many features to commend it, and with feeder, junction, coupling and service

1882 1917

IN A BUILDING ON THIS SITE AN ELECTRIC
PLANT SUPPLYING THE FIRST EDISON
UNDERGROUND CENTRAL STATION SYSTEM
IN THIS COUNTRY AND FORMING THE ORIGIN
OF NEW YORK'S PRESENT ELECTRICAL SYSTEM
BEGAN OPERATION ON SEPTEMBER 4, 1882
ACCORDING TO PLANS CONCEIVED AND
EXECUTED BY

THOMAS ALVA EDISON

TO COMMEMORATE AN EPOCH MAKING-EVENT
THIS TABLET IS ERECTED BY
THE AMERICAN SCENIC AND HISTORICAL PRESERVATION SOCIETY
THE NEW YORK EDISON COMPANY

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boxes, straight and T-joints, safety catches, etc, presented a truly remarkable aggregation of intensely practical and effective electrical and mechanical details. The service and house wiring, with their various devices, such as service cut-outs and fuse blocks, in every conceivable combination for main lines and single and double branches, with their safety-catch plugs, circuit switches, key sockets and plain sockets, fixture bugs, etc, all representing a perfection of detail, an adaptation of means to the desired end, were so responsive to every requirement that it was many years before the industry could show any other series of devices that were anywhere near to an equivalent. Of course, these devices were at first rather crude, with their wood fuse blocks and plugs, with conical rim and barrel screw contacts all designed before the porcelain and glass industries occupied themselves with mechanical products and produced molded and pressed forms; but the early devices met the situation, and, moreover, they worked, and enabled the central station companies to do business with them.

One of the most interesting as well as a most important feature of the Edison system was the Edison chemical meter.

In this early type of electric meter, a german-silver shunt of exact resistance proportioned to the rated capacity of the meter, had connected to its terminals a derived circuit consisting of a copper wire resistance spool in series with a bottle containing two zinc plates immersed in a solution of zinc sulphate. When a current of electricity passed through the meter, the zinc was removed electrolytically from the positive and deposited on the negative plate, and the amount of current was determined by the difference in weight of the positive plate before and after, the amount of current in the derived circuit having a constant, definite relation to that passing through the german-silver shunt and hence to the current supplied to the consumer; each unit of current, according to an electro-chemical law, invariably removing a definite amount of zinc from one meter plate to the other and thus affording an accurate measure of the current supplied to the consumer.

Was there ever a more beautiful adaptation of a physical law than was presented in this ingenious commercial electrochemical device for translating, first the lamp-hour and then the ampere-hour, into dollars and cents? The compensating spool furnished an exact temperature corrective, the bottle circuits decreasing in resistance and the copper spools providing an off-setting increase in resistance with increase of temperature and the thermostat with its heating lamp keeping the bottles from freezing. It is no exaggeration to say that no single device in the whole system did more to lay the solid foundation for the commercial and financial success of the Edison Companies from the very first than the chemical meter, with all its shortcomings that made it appear so impractical to the laymen.

A word should be added as to the wonderful flexibility of the system, which made it so easy to operate on its circuits the various types of multiple open and enclosed arc lamps as they were developed, and which speedily sounded the death-knell of their older rival, the series open-arc lamp; the application of the electric motor to the system, operated right off the very same wires as the lamps; and the thousands of heating and cooking devices and convenience equipment of every kind which have made it necessary for the modern house to be equipped with almost as many auxiliary outlets as lamp sockets—all these were provided for in the fundamental conception of the Edison system from the very first and could be applied as they were developed by the manufacturer.

STATISTICAL DATA

1882–1922

It may be of interest to give just a few statistical figures indicative of the service growth and expansion of the generating and distributing equipment of the Company during the four

decades of its operation. It was incorporated in 1880 as the Edison Electric Illuminating Company of New York, with a capital stock of $1,000,000, its municipal franchise to use the streets of New York for its underground system bearing the date of March 22, 1881. During the experimental period covering the last four months of 1882, service was rendered to the customers without charge. During the year 1883, from and including February, the income of the Company reached a total of $53,089, for the year 1884 it was $111,872, while last year, 1921, the operating income of the Edison-United Companies reached a total of $50,761,531. In August, 1882, the Company's payroll amounted to $71,000 per year, in July, 1922, it was at the rate of over $13,000,000 per year. On October 1, 1882, a month after starting, the Company had 59 customers, at the beginning of 1883 it had 231 customers—at the end of 1884, 592 customers, while at the end of 1921 the Edison-United Companies together had over 370,000 customers on their books. The total connected installations on customers' premises expressed in 16-candlepower equivalents, was at the end of 1882—3,477 or about 2,340 50-watt equivalents, and at the end of 1921 the Edison-United Systems together had a total of about 23,500,000 50-watt equivalents connected. The output for the year 1884 expressed in kilowatt hours was 864,000, while for the year 1921 the output of the Edison-United Systems reached a total of nearly 1,500,000,000 kilowatt hours. The maximum generating station load of 1884 was approximately 510 kilowatts, while in 1921 the Edison-United generating stations carried a combined maximum load of 438,000 kilowatts; the load factor in 1884 was 19.3 per cent, while in 1921 the Edison-United had a combined yearly load factor of 38.4 per cent. The area served in 1882–3 was about 1/6th of a square mile, in 1921 the service in Manhattan and the Bronx covered over 41 square miles of territory. The station generating capacity in 1883 was 600 kilowatts in a single plant, at the end of 1921 the generating capacity of the Edison-United Systems reached 694,500 kilowatts in eight generating stations; in 1882 there were no sub-stations, in 1921 they numbered forty-three.

The first low tension multiple arc lamp was connected to the system in 1889, and in the year 1908 the low tension arcs reached a maximum of over 40,000; since then they have been very largely replaced by high candlepower tungsten lamps. The first motors, small fan motors, were connected to the system in 1884, and at the end of 1921 the combined motor load of the Edison-United Systems reached a total of 523,022 kilowatts, or over 700,000 horsepower. There were in 1884 about 15 miles of low tension feeders and mains, at the end of 1921 the Edison-United low tension system comprised a total length of over 3000 miles; there were no high tension feeders in existence in the early years of the Edison system, but at the end of 1921 the Edison-United System included over 880 miles.

At the most economical plant on the system today a pound of coal produces, when delivered through the lamps of today, over 25 times the amount of illumination produced at the Pearl Street Station; there the original generator units per unit of power occupied over 40 times the floor space and weighed per unit 20 times as much as the generator units at the new Hell Gate Station.

When the Pearl Street Station started, the common types of lamps were the 8 candlepower (50-volt), and 16 and 32 candlepower (110 volt) Carbon (Bamboo) lamps with an efficiency of 4⅔ watts per candlepower increased to 3.1 watts per candlepower in 1888; in 1894 came the "squirted filament" or cellulose oval loop filaments and in 1905 the "Gem" metalized filament with an efficiency of 2½ watts per candlepower. These were followed by the Tantalum metallic filament lamps of 2 watts per candlepower, soon superseded by the Tungsten filament lamps, first with pressed filaments, then with drawn wire—operated in vacuo or gas-filled—with efficiencies of 1.1 watts per candlepower in the smaller to as high as .75 watts per candlepower in the larger gas filled types.

In his early survey of New York City, Mr Edison divided the City of that day into thirty-six districts, each of which was to have its centrally located power plant. The first station was located in Pearl Street, followed by the second and third generating plants in the year 1888, located respectively at West Twenty-sixth and West Thirty-ninth Streets. The next plant was located at Duane Street in 1891, where at first 600 horsepower engines were installed, followed by 1250 horsepower engines, and finally in 1893 2500 horsepower vertical quadruple expansion engines were installed of the highest type known to Marine practice, each operating a pair of 800 kilowatt dynamos. In 1893, the station at West Fifty-third Street was installed, equipped with an imported Crompton-Howell (English) storage battery, the first low tension generating station in America so equipped. In 1895, the last of the stations generating low tension direct current in New York City was installed at East Twelfth Street, equipped with a 300-kilowatt De Laval steam turbine, driving two 100-kilowatt dynamos; another similar unit was installed about the same time in the Thirty-ninth Street station; these were the first steam turbines to go into central station service in this country. An experimental station involving the first high tension transmission in connection with The New York Edison system was installed in 1896, transmitting current at 2400 volts, from the allied Manhattan Company station at Eightieth Street and East River, to be converted into direct current by motor-generator sets installed temporarily at Seventy-second Street and Fifth Avenue.

In 1898 the first application in New York of rotary converters was made, taking current from the direct current low tension bus bars at Duane Street and, after conversion to alternating current and stepping up the pressure through static transformers, transmitting it as high tension three-phase current at 6600 volts to the Thirty-ninth Street station and there by similar apparatus and inverse process, reconverting the current and putting it on the bus bars as low tension current.

All of the direct current generating apparatus has now been removed with the exception of the Duane Street equipment, with its original steam engines and low tension dynamos, which remain in service to provide valuable direct reinforcement for the very important service of the downtown districts. The remainder of the current for distribution as low tension direct current for the numerous sub-stations located in many sections of the City below One Hundred and Thirty-fifth Street is generated as high tension alternating current, three-phase 25 cycles at 6,600—11,000 volts and transmitted for conversion to low tension direct current through step-down transformers and rotary converters at the sub-stations; each of the sub-stations being equipped also with a liberal storage battery reserve.

The Edison-United Companies together cover with their service practically every street in the Boroughs of Manhattan and the Bronx, and in addition supply the current requirements of The Yonkers Electric Light and Power Company and part of the current required by their allied companies in Queens and Westchester.

Through the medium of the allied Westchester Companies, some of the current generated in the Manhattan and the Bronx plants is transmitted at 45,000 volts as far as the boundary of Putnam County, some 45 miles from New York City Hall.

Low tension direct current service is supplied exclusively by the Edison Company south of 135th Street on Manhattan Island and alternating current in the Borough of the Bronx, while the allied United Electric Light and Power Company, forming part of the Edison-United System, supplies alternating current to customers throughout the Borough of Manhattan.

Marked changes have taken place during these forty years in the method of underground distribution, all of the current

being supplied over lead-covered cables laid in the subway ducts of the Consolidated Telegraph and Electrical Subway Company, except for the Edison Tube System laid prior to 1895, part of which still remains in service.

Having summarized briefly some of the more important engineering developments on The New York Edison System during the past forty years, we must now give consideration to the commercial and public relations of the Company and its no less important relations with its employees. In these later years the engineering problems and apparatus have become more or less standardized and the commercial phases of the business have assumed predominant importance.

Much as we should desire to do so, it would be manifestly impracticable, within the limits imposed by an address appropriate to this occasion, to undertake to give the names of the distinguished men who have been, and many of whom are still, connected with the Company in its various administrative, commercial and engineering activities. Many of these names are household words in the Industry and they are recognized as leaders in the financial, commercial, and technical branches of central station public utility service, taking an active part in designing and developing advanced improvements in the Art and in formulating the progressive public and Company policies which have so notably contributed to the expansion and prosperity of the companies engaged in the electric light and power business.

Parallel with this phenomenal progress in engineering and industrial achievement, The New York Edison Company from its inception laid deep and secure the foundations of those administrative and public policies which have made its motto "At Your Service" not a mere advertising slogan, but a dedication of the Company to the service of the Community by a recognition of its essential trusteeship for the public. While we point to this accomplishment with justifiable pride, we must hasten to add that the distinguishing characteristics of this Company's policies were not singular or peculiar to itself, they were also conspicuously present in all of the sister Edison Companies established later in other cities. Each of these, without exception, has in some form, and in substance, survived and prospered and in every case under the leadership of men who have as a rule risen from the ranks, who were appreciative of their responsibilities to the public and who knew how to enlist the loyalty and co-operation of an efficient staff of employees.

Each of these companies has made of itself a veritable public institution, a local instrumentality, ministering to the needs and conveniences of its community, growing with it in territory and prosperity and bringing to it the advantages of a progressive and public spirited enterprise.

It seems appropriate at this time and the fulfillment of a very pleasant duty to bear testimony to the unfailing loyalty, devotion and enthusiasm with which every Edison employee, however humble or exalted his allotted task may have been, has always responded to the infectious enthusiasm of his leaders, maintaining a sympathetic and cordial relation between employer and employee and recognizing that out of such reciprocal appreciation and mutual confidence would inevitably grow the loyal co-operation which has ever been a conspicuous characteristic of the great industry which received its baptism of service in this city forty years ago.

It has been a recognized canon of the central station industry, for which the pioneer Edison Companies may claim credit, that no effort or reasonable expense may be spared that the service shall not fail, and every man in the organization feels a personal pride and interest in maintaining the record in this respect, and the success of our enterprise in every phase of it is due in no small measure to a full recognition of our obligation to maintain continuity in the service to our customers. Without such a successful determination, helped enormously it is true by the perfection of the system, it would have been impossible to lift our business from a kind of show business in many respects at first, to a vital necessity filling every possible requirement for Electric service throughout the community, however critically important to the maintenance of civic life and health, and in magnitude however great or small from electric service rendered to trunk line railroads to the single lamp of a news-stand.

One of the conspicuous company policies, a heritage from the Pioneer days, to which we would direct particular attention at this time, is that of unfailing courtesy and polite consideration given to the public and to subordinates in the service. It has been from the first a well recognized rule, a fixed habit, as it were, of Edison service, that the same degree of attention must be given to the smallest as to the most important of the Company's customers and, from the fact that the service must be continuous night and day, no question of convenience or timeliness must be allowed to interfere with a prompt response to a complaint or a request for attention on the part of a customer.

In the very beginning it was found necessary to establish classes for the instruction of employees in specialized branches of the new service and in later years the Educational courses established by the Company for the benefit of its employees, with the co-operation of their Association, have covered every important phase of its business accounting and administration; commercial relations and salesmanship, and the various engineering branches include also laboratory practice. Recognizing how important it is to provide for succession and progression in the service it is considered a fundamental necessity to so train the minds and faculties of the employees that they may be capable of immediate response to the opportunities for advancement and the filling of ever higher positions of responsibility and emolument.

It was early appreciated that positions, however humble in the scale of organization, which brought the employee in direct contact with the customer were of supreme importance in securing a favorable opinion and the good will of the public, and recognition of the fact that a pleasing personality and considerate attention to the customer's point of view, on the part of the Company's representative would go far toward eliminating possible dissatisfaction with the Service. So with the question of rates, to which only the briefest reference is here possible, it has been the policy, while endeavoring to provide an income which would cover all proper costs, a fair return on the investment, and an adequate margin for contingencies, that the measure of the service rendered should be presented in the schedule of rates under such a form as to be simple, flexible and easily understandable by the customer and as far as possible such as to strengthen the Company in its public relations.

The Rate Schedules, under the jurisdiction of the State Public Service Commissions which afford a recognition within the last decade or so of the essential character of public utility service through the establishment of this public regulatory authority which had no existence in the early days, have been adjusted from time-to-time so as to be responsive to new service requirements and providing rates which have been on a continually descending scale as promptly as improvements in the cost of rendering the service have made revisions practicable, thereby enabling the fulfillment of the larger demands of the public, ever expanding application of electric service and aiming always at giving the customers fair treatment at every point.

In order to bring the rapidly appearing progressive improvements in lighting equipment and electric appliances of every kind to the attention of the public, as promptly as possible after they were developed and could receive the Company's endorsement as safe and practicable apparatus for Commercial use by the customer, it was necessary, soon after the early years of solidifying the service had passed, to provide for proper publicity. Thus arose a most important series of activities comprising publicity literature such as advertisements in the daily press, house-organs, pamphlets, circulars and novelty publications—such as calendars, posters,

etc—and through the establishment of show-rooms, model furnishings and electrically equipped houses, organization among customers of classes in domestic science and home economics, and practical demonstrations of industrial and therapeutic apparatus, to bring to the public's attention the infinite variety of electrical applications which a purveyor of light and power service has to offer.

It affords an interesting study to note the outstanding importance which all of these commercial activities, most of which were unknown to the earlier days of intensive engineering development, have now assumed, and the very large—we may say—largest part they play in securing an effective utilization of the service once it has been brought to the door of the consumer.

Again we may not occupy the time more than to call passing attention to the many activities for promoting the interest and esprit-de-corps of employees, many of them supported by the Company, others organized and maintained by the various employees' organizations. These activities include club rooms, libraries, athletic fields, boy scout troops, dramatic clubs and musical organizations such as brass bands, orchestras and glee clubs. But it is to the organizations for the economic and mental improvement of the employees that we would direct particular attention and it is these in which their spirit of desire for advancement and betterment has found most gratifying expression. We refer to such institutions as thrift clubs, the Building and Loan Association, life insurance and sick benefit groups, and active participation in the parent and local organizations of the American Institute of Electrical Engineers, American Societies of Civil and of Mechanical Engineers, The National Electric Light Association, Illuminating Engineering Society, etc, etc. We should refer also to the active participation of our Company, and in fact of all the sister Edison Companies, in the great national celebrations, local parades, and demonstrations in which they have always had such a conspicuous part and in such popular movements as the sound money and preparedness parades, and last, but foremost of all and more fully recorded under other auspices, the wonderful patriotic responses to the Liberty Loan, Red Cross, and Food and Fuel Campaigns, and the splendid co-operation rendered to our government by the Executives of all the Companies beginning with the conspicuous patriotic example of our distinguished guest of the evening, Mr Edison himself; and, finally, the splendid service records and memorials of the Companies in which the names of so many Edison men who made the supreme sacrifice for their country are recorded in letters of gold.

The Edison Companies have uniformly been progressive, have kept their plants and equipment up to date and have, as soon as developed, installed the latest, most improved and most efficient types of apparatus, placing them ever in the forefront of mechanical and electrical progress in construction and operation. This policy has often involved the acceptance of rapid changes, executed in brief cycles of time, to keep pace with the evolutionary advances in the art, which a numerous group of brilliant inventors has so ably aided and abetted often assisted by the technical staffs of the operating companies, and supported by a number of active, progressive and prosperous manufacturing companies. As it was said of Edison in the early days, that he kept the path to the Patent Office hot with his footsteps, so these manufacturers, ever keen for new business, have verily kept the path from the plant to the scrapheap congested with the wrecks of supersession and obsolescence.

That the sister Edison companies too, like our own, have flourished like the proverbial green bay tree, was to be expected, as they all had for a common heritage a thoroughly practical and sound system to exploit, were given the same initiation into broad and liberal policies toward the public, and they have one and all spared no effort to create a favorable public opinion founded on rendering the highest standards of service at reasonable rates.

We of The New York Edison Company, therefore, rejoice with due humility but with pardonable pride, that we have succeeded in these forty years of "At Your Service," in enlisting the good-will of our customers, in establishing and maintaining amicable relations with the public authorities as they came and went under different administrations, and in meeting all the rapidly expanding needs and requirements of this greatest American metropolis. But these successes of the past, due so largely to the helpful patronage and support of our customers and for which the Company is duly grateful, open up a bright hope of future increasing usefulness to the community, encourage a re-dedication of our efforts to excel in its service, and invite a renewed devotion to its highest and best interests.

We thus shall make this great city a pleasanter place in which to live, we shall hope to bring to the homes of the humblest of its citizens, the comforts and conveniences conceived by the world's greatest inventor, and in bringing to our community brighter and more cheerful homes, a more devoted feeling of citizenship and a more powerful attachment to our city, we shall thus carry out to its fullest development the marvelous conception of the great master mind, the launching of whose great adventure forty years ago we have met here to celebrate.

We, The New York Edison Company, are proud to bear his name and we appreciate the honor which his presence here this evening and that of his gracious and charming wife, lends to this great occasion marking another milestone in the progress of our beloved old New York.

As Mr Richard Rogers Bowker, a former distinguished vice-president of the Company, has so beautifully expressed it in his sonnet entitled "Fama Eterna":

"*Blest is the man who for his country dies,*
Twice blessed he who lives to serve mankind,
Thrice blessed he who in life's little hour,
Searching God's treasure-house with lucent eyes,

A lamp for all men and all times may find, and thrill the world with light and heat and power."

THE TOASTMASTER: Ladies and gentlemen, I wish, on behalf of The New York Edison Company, to thank you all for your presence here this evening, thus evincing your high regard for our guest. I wish also to thank him and thank Mrs Edison for their presence here, which has made this occasion possible. (*The company then dispersed*)

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END OF TITLE